

ROCKY CREEK CONSERVATION AREA



Rocky Falls

PINE OAK WOODLAND DRIVING TOUR

Rocky Creek Conservation Area Pine Oak Woodland Driving Tour

(see attached map on last page)

Welcome to the Missouri Department of Conservation Rocky Creek Conservation Area Pine Oak Woodland Restoration Project driving tour. The tour is approximately five miles in length and will explore most of the silviculture (forest management) prescriptions used in the project. Historically, Pine Oak Woodlands covered vast areas in Missouri that had an open understory and was covered with a diverse herbaceous layer of grasses, legumes, and forbs similar to those found in prairies. Tree canopy closures varied ranging from 20 to 70 percent. The goal of the project is to create a pine-oak woodland and related wildlife habitats and provide for forest products in a sustainable manner. As part of the management, prescribed fire will be used to maintain the woodland structure and enhance early successional habitat (grasses and forbs) that is beneficial to so many species of birds and mammals.

The driving tour starts at the junction of roads 313 and 324 then follows 324 in a southwest direction to road 313. The tour continues east and north to road 324 then travels north and west coming back to the start at roads 313 and 324. Roads are marked by brown square wooden markers with white numbers at the intersections. The silviculture treatment areas are identified by yellow signs with numbers one through nine that correspond to the numbers in this pamphlet.

A map of the project area and driving tour is included on the last page of this pamphlet.

If you are ready to begin the tour, be careful, and please enjoy Rocky Creek Conservation Area's pine woodland restoration project tour. As always, if you have any questions about this project or if you want information about resource management assistance on your land, please contact the local conservation office in Eminence, telephone 573-226-3616.

Let us begin our journey at the junction of roads 313 and 324 and proceed to the first point.

- 1.) **Intermediate w/ Timber Stand Improvement** : From the starting point on both sides of the road to where the road starts downhill, you are looking at an intermediate harvest combined with timber stand improvement (TSI) in a shortleaf pine / mixed oak pole stand. This stand of trees is approximately the same age and were established by aerial seeding about 50 years ago. Intermediate harvests are used to improve growing conditions to favor future crop trees prior to the final harvest. Trees were harvested around selected crop trees to make more sunlight, nutrients, and growing space available over time. Trees were also cut to adjust spacing that will allow the remaining trees to utilize the site more efficiently. The harvest also allowed us to improve species composition more suitable to the site and the woodland natural community. Timber stand improvement activities involve the cutting or removal of undesirable species or poorly formed trees that will not be profitable to remain in the stand. The goal with this prescription, as with all of the management techniques, is to leave the forest in a better condition after the harvest than before.
- 2.) **Old Growth**: The entire olive green colored stand (2) is within a upland drainage riparian corridor. The silviculture treatment here is to do, simply, nothing. This area will be designated old growth in successive entries and remain for nature to take her course. Management here for the long term is, simply, to do nothing. This is important because of the sensitive nature of the soils within this area as well as for the unique natural communities found here. One of the first priorities of resource management is to protect water quality. Water moving through this area will eventually reach the Current River. No management activities in this drainage will help protect the water resource and insure quality aquatic habitat downstream.

Old growth provides for a unique habitat type that provides mast, or nuts and acorns, and nesting places for many species of birds and mammals. Old growth also provides for pleasing aesthetics where large majestic trees will grow and develop over time. This upland corridor contains many different species of trees and shrubs found only in these type areas. Species such as witch hazel, ninebark, muscle wood, vaccinium, blackhaws, and even many different species of ferns thrive here. Best management practices used in logging restrict equipment use in bottomlands and the old growth prescription fits this requirement.

- 3.) **Uneven-age management:** Opposite of stand two (2), on the right hand side of the road, is an example of uneven-age management (UAM). The UAM system, with its continuous forest stocking, will preserve aesthetic qualities and allow us to meet our woodland management objectives. This style of management will also create a more favorable species composition and structure suitable to the site. Uneven-age management provides for marking trees as small as six inches diameter at breast height throughout the stand to improve the quality of the forest. This practice is called timber stand improvement or TSI for short. Timber stand improvement activities not only promotes new tree growth but also enhances the overall health and vigor of the remaining trees that will allow them to grow into valuable large diameter sawtimber.

Trees harvested in groups create gaps in the canopy that emulate natural disturbances. This allows sunlight to reach the forest floor to promote new trees to grow. Group openings are visible from the road in a couple places throughout the stand. All trees in a 130-foot diameter opening have been cut down creating regeneration areas that are about one third acre in size. In these areas, in part, new trees will sprout from roots and stumps and begin a new age class. Uneven-age management, once implemented, usually has three or more different age classes of trees. At each entry about every 15 years, older trees will grow into harvestable size, while the younger trees increase stocking levels of different sizes throughout the stand. This continuity of different age trees will allow for sustainable harvests through time. At each entry, trees harvested with this system create another set of group openings to start the cycle over again.

At the road junction of 324 and 313 you will need to turn left to proceed to point four.

- 4.) Pine Regeneration:** Shortleaf pine historically grew in many places where scarlet oak, black oak, and hickory grow now. Stand four is an attempt to regenerate pine on a site that is more suitable for this species. New shortleaf pine trees, however, have to come from a seed source as they usually do not re-sprout from roots or the stump. Here, large healthy pine have been left throughout the stand to provide a source of seed that will establish the new pine forest. Pine seeds have to have bare soil and sunlight to become established. Following the timber harvest, the remaining low value non-merchantable trees were cut down to allow sunlight to reach the forest floor. Disturbances from harvest activities that exposed soil in places creates a suitable seedbed. Together, bare mineral soil, sunlight, and moisture will create conditions that will allow a new forest with both pine and oak species to develop.

This stand faces to the west and has shallow soils and harsh growing conditions. Shortleaf pine are well adapted to these xeric, or dry, conditions, as well as trees in the white oak family including white oak, chinquapin oak, and post oak. Shortleaf pine prefers this type of site and will grow better than many species of oak and hickory.

The lush vegetation you see now covering the stand began growing in the spring of 2005. For the next ten years, the stand will continue to develop and proceed through a process called succession. Many grasses and forbs, essential to small game, will utilize this area before the pine, oak, and hickory trees develop and eventually overtop the herbaceous layer.

Many misconceptions exist about regeneration areas. Two that come to mind are loss of wildlife habitat and soil erosion. Any competent hunter knows where to find deer, quail, and rabbits. This stand would be one place to look. Young turkeys will also use this stand as a brooding area in the spring. Because of best management practices used to prevent erosion problems and wet weather logging restrictions, soil erosion problems are held to a very minimum. Another interesting misconception is that the smaller trees left after

a harvest, are 'young' trees. The majority of these trees are suppressed, growing below the main canopy, that are the same age as the larger sawtimber size trees that were harvested! Suppressed trees in this condition will never respond and grow into the same size and quality as the ones that were harvested. They are best cut back to allow a new tree to develop from the established root system.

Whitetail deer utilize regeneration areas for the abundant tender browse and the thick cover provides excellent bedding areas and escape cover. Deer eat acorns from mature trees, but they are also fond of buds and leaves on newly sprouted trees and the many herbaceous plants that increase after a timber harvest. Deer and turkey use cover in these areas to hide and raise their young. Cottontail rabbits thrive in the transitional area between open land and forests. Owls need mature timber to nest and roost, but also open land to fly and catch rodents that make up much of their diet. In fact, all species of wildlife depends on food and cover. Timber management in the woodlands, as well as other conservation areas provides for the basic needs of wildlife and for the sustainability of the forest that, ultimately, we all depend upon.

- 5.) **Intermediate Harvest:** Here the forest is even-aged shortleaf pine large poles and small sawtimber size trees. It was heavily stocked and trees were in a very crowded condition. The stand was thinned from below with an intermediate harvest. This harvest removed merchantable size trees in areas that had trees growing too close together and trees that were poorly formed, but still had value. The goal of the harvest was to increase growth rates and improve the health and vigor of the remaining trees. Our best trees remain, trees that will be worth **more** in ten to fifteen years. In relation to the restoration project, this thinning will help create the 'woodland' structure that is more open than what it was before. The sale created revenue from the forest products, as well as improved the condition of the forest.

This stand is similar to stand number one, except that it lacks the smaller pole component that the timber stand improvement treatment addressed. Again, the goal was to improve the condition of the forest. Several trees were harvested from this area, but as you can see, many remain that will only increase in value over time and provide quality habitat for many birds and mammals.

One common misconception about intermediate harvests is that you will be able to come back in perpetuity and harvest forest products from a selected stand. Depending on how many trees are harvested each entry, this stand will provide for one or two additional intermediate harvests before the stand has to be regenerated. After the second entry, and most certainly the third, the majority of the remaining trees will be culls and unacceptable growing stock with little or no value, especially in hardwood stands. Not enough time passes between entries with this method to continually grow sawtimber size trees on a sustainable basis. Pine stands will grow more trees per acre which may allow you the third entry, but most oak and hickory forests will not.

The tour takes another left hand turn at the next gravel road number 323. If you end up at 'H' highway, sorry, you went too far.

- 6.) **Woodland Management:** An important objective with the initial management of this project was to adjust tree spacing and species composition. This was done commercially where possible, but here we contracted to have all oak and hickory trees less than eight inches diameter at breast height cut. The remaining trees, post oak, white oak, shortleaf pine, and blackjack oak are in a woodland structure.

Although this is a very poor site, trees will benefit from the thinning with increased growth rates and improved health. The goal of this management is to increase nut and acorn production in this area. The benefits that woodlands produce is because of their structure. Sunlight is necessary for the herbaceous community of grasses and forbs to develop on the forest floor. Gaps in the canopy are necessary for sunlight to stimulate grass and forbs growth. The herbaceous layer, which may include big and little blue stem, lespedeza, tick trefoil, ragweed, Indian grass, blackberry, and woodland sunflowers, just to mention a very few, will provide valuable nesting, food, and cover to a wide array of wildlife, including turkeys and quail.

The open nature of a woodland community is very attractive to other birds including yellow-throated warbler, Carolina chickadee, and the chipping sparrow. Ultimately, the goal of this project, in combination

with other states agency's landscape scale woodland restoration activities is to bring back extirpated species of birds to Missouri including the red cockaded woodpecker, brown-headed nuthatch, and Bachman's sparrow that have been lost from the state due to loss of suitable habitat.

You have probably noticed the thick growth of sprouts resulting from the cut trees in 2005. Many herbaceous plants mentioned above have also developed because of increased sunlight and the removal of the smaller trees in this area. Most of the grasses and forbs, interestingly enough, came from seeds that were already in the soil that may have been there for decades! The seed bank and persistent vegetative nature of these plants allows for successful restoration potential on many sites.

Unfortunately, the benefits of this early successional habitat are quickly being lost to shade and competition from the developing hardwood trees. Periodic disturbances are needed to set back succession and retain the semi-open conditions of the woodland structure. Careful use of prescribed fire will be used as a management tool in the project area. The fire will kill many small shade tolerant species in the understory as well as remove the duff, or leaf, layer helping to recycle nutrients and stimulate the herbaceous seeds that is in the soil.

Shortleaf pine seedlings were planted in parts of the other woodland management stands southwest of the point six. Approximately 450 trees per acre were planted in areas that contained little or no pine. The trees were hand planted by department personnel and came from the Licking Nursery in 2002. This will enhance the species diversity and provide for stem replacement following the prescribed fires. Fortunately, shortleaf pine seedlings have the ability to re-sprout after being set back by fire and will out-compete oak and hickories on poorer sites.

- 7.) **Group Openings:** Just visible from the road is the start of a series of group openings. The openings are approximately one third acre in size and all trees have been cut in the openings. This is the beginning of uneven-age management that will be used in this stand over time. The

group openings will recruit another age class within the stand as described in stand number three's description. Structural diversity will also be enhanced as well.

These openings were created in a stand that was even-aged and 40 to 50 years old, but too small to harvest commercially. Other benefits include the establishment of over an acre of early successional habitat. Associated with each opening is the 'edge' around the perimeter. Many different birds and mammals prefer this transition zone. This vertical structure, in addition to the early successional grasses and forbs, provides quality food, cover, and nesting habitat.

- 8.) Shelterwood Regeneration:** The trees you see remaining here fit the definition of 'woodland' structure. The understory is more or less open and canopy closure varies from 20 to 60 percent. Residual trees are mostly post oak, white oak, and shortleaf pine sawtimber size trees. These were selected because they are long lived, produce wildlife benefits, and are adapted to fire. The stand has had most of the smaller suppressed trees cut down, but many have re-sprouted since being cut in 2005. Grasses and forbs have also begun to occupy the site. Because trees will overtop and eventually shade out the herbaceous layer, disturbances of some type in needed set back or eliminate the sprouts. It is, after all, this semi-open structure that is desirable, with the diverse herbaceous layer and related benefits, in woodland management. Brush hogging or herbicide use on the sprouts is possible on a small scale, but is not economically feasible over large areas.

Shelterwood management offers the most in restoration potential, at least in the short run, because the open woodland structure is created with the timber harvest and slashing activities. Prescribed fire at regular intervals, however, is critical to prevent sprouting and maintain the herbaceous layer.

Use of prescribed fire involves risks and should only be attempted by trained personnel. Should you wish to use fire on private lands, please consult the local state conservation office or the Natural Resource Conservation office for more information. Prescribed burn workshops are sponsored by Missouri

Department of Conservation in the spring of most years to provide training to persons interested in using this type of management.

- 9.) Timber Stand Improvement:** The purpose of timber stand improvement, or TSI, is to free desirable trees from competition, thin the trees to desirable numbers, and remove unacceptable growing stock. This improves the overall health and vigor of the stand and wood growth is concentrated on selected trees. The trees that were thinned here averaged from four to ten inches diameter at breast height and will readily respond to release. Timber is like any other agricultural crop, it needs care during its lifetime to produce a high-quality product and to give the landowner the greatest financial return.

The best trees were selected for release. These are going to be the final crop trees that will be harvested only after they have reached their full growth potential. Selected stems should be of desirable species and have tall, straight, clear trunks free from insect or disease damage, fire scars, decay or mechanical damage. The crop trees should have a full, healthy crown with no large dead branches. The crowns should be at the general level of the main canopy and be the better growers.

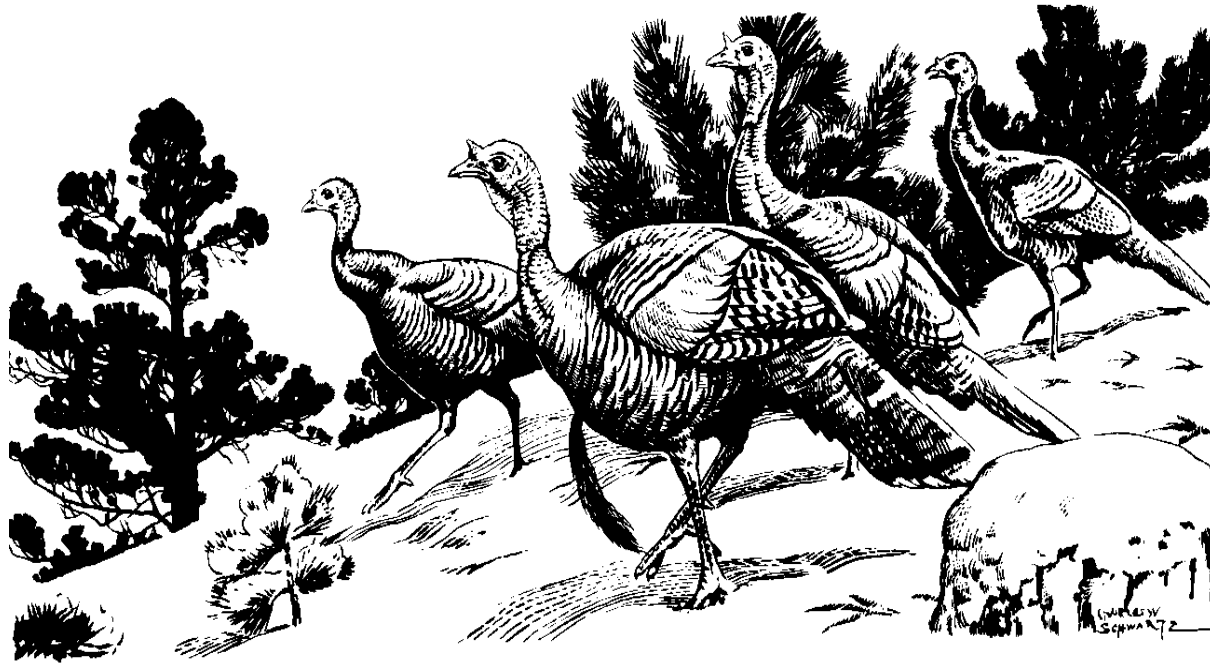
As a general rule of thumb, the diameter times two spacing rule can be used as a guide for timber stand improvement activities in small stands. One simply doubles the diameter of the selected stem and in feet that is the spacing to the next tree that needs to be cleared.

CONGRATULATIONS! When you reach the 313 road, you have completed the tour. We hope you have gained a better understanding of the resource management here on Rocky Creek Conservation and of the Pine Woodland Restoration Project.

Resource management assistance is available free to Missouri landowners by the Missouri Department of Conservation. Resource professionals are here to assist you with the management of your land. Plans can be developed to meet your specific resource management needs including, timber, wildlife, warm season grass,

fish and ponds, and many other resource issues. You, the landowner, remain in control of your property and are in no way under any obligation the Department for services provided.

If you have questions about the management activities seen today on state land or have questions about the resources on your own property, please do not hesitate to contact the Missouri Department of Conservation local office in Eminence, telephone 573-226-3616. Thanks for being part of the tour!



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**Rocky Creek Conservation Area
Pine Woodland Restoration Project
Driving Tour
Shannon County, Missouri
4.75 miles**

**Start Here
Roads 313 / 324**

**Turn North on
Road 323**

